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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/584,639	06/26/2006	Woo-Yong Lee	123054-06079419	5027

22429 7590 12/10/2008

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EXAMINER
DOAN, PHUOC HUU

ART UNIT	PAPER NUMBER
2617	

MAIL DATE	DELIVERY MODE
12/10/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/584,639	LEE ET AL.	
	Examiner	Art Unit	
	PHUOC H. DOAN	2617	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13 August 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-25* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-5 and 22-25* is/are rejected.

7)☒ Claim(s) *6-21* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 101

1. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 1, 22, 24, and 25 are rejected under 35 U.S.C. 101 because:

Claim(s) **1, 22, 24, and 25** is/are rejected under 35 U.S.C. 101 as not falling within one of the four statutory categories of invention. While the claims recite a series of steps or acts to be performed, a statutory "process" under 35 U.S.C. 101 must (1) be tied to another statutory category (such as a particular apparatus), or (2) transform underlying subject matter (such as an article or material) to a different state or thing.

An example of a method claim that would not quality as a statutory process would be a claim that recited purely mental steps. Thus, to qualify as a 101 statutory process, the claim should positively recite the other **statutory class (the thing or product) to which it is tied**, for example by identifying the **apparatus that accomplishes the method steps, or positively recite the subject matter that is being transformed, for example by identifying the material that is being changed to a different state**.

Response to Arguments

2. Applicant's arguments with respect to claims 1-25 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1-5, and 22-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sudo (US Patent No: 6,345,036) in view of Jalali (US Pub No: 2003/0095506).

As to claim 1, Sudo discloses an adaptive resource allocation method in a multi channel communication systems, comprising: (col. 3, lines 57-65 "**OFDM transmitting and receiving apparatus with one channel are converted to signals of four channels**") determining a sub-channel channel gain according to channel quality (col. 10, lines 34-40 "**combining the bit shift circuits and controller based on reception power of each sub-**

carrier whereby making it possible to perform precise transmission power control") ; and determining an optimal number of bits to obtain minimum power for a total transmission rate according to the determined optimum number of bits (col. 7, lines 36-44, col. 10, lines 30-50 "**value from the average value is multiplied by the coefficient and associated with the bit shift circuit to optimum number of bits is required**"); and allocating a final number of bits to be transmitted for the sub-channel according to the optimal number of bits (col. 10, lines 1-7, and 32-50). However, Sudo does not disclose determining a modulation method for each sub-channel based on the channel gain, wherein the determining of the modulation method includes: allocating a number of bits to be transmitted to a sub-channel according to the channel gain.

In the same field of endeavor, Jalali discloses determining a modulation method for each sub-channel based on the channel gain (page 5, par [0071] "**at step 218 and associate with the threshold SNR sub th rate is a function of the modulation scheme**"), wherein the determining of the modulation method includes: allocating a number of bits to be transmitted to a sub-channel according to the channel gain (page 4, par [0053] "**sub-channels is also referred to as bit loading to provide the estimate of the Signal to Noise Ratio SNR for the equivalent AWGN channel**").

Therefor, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide a modulation, wherein the determining of the modulation method includes: allocating a number of bits to be transmitted to a sub-channel according to the channel gain as taught by Jalali to the system of Sudo in order to **effectively** code and modulate data in optimize for transmission in an OFDM system.

As to claim 2, Jalali further discloses the adaptive resource allocation method of claim 1, wherein, in a), a Lagrange multiplier .lamda. is analytically and experimentally estimated to determine the optimal number of bits (page 4, par. [0054-0058] "**an Eq (6) which multiplier lamda defined based on the sub-channel with over all frequency sub-channel to provide the estimate of the SNR in combination of the function f(x) as the theoretical maximum data rate is defined based on the constrained channel capacity function on the Eq (6)**").

As to claim 3, Jalali further discloses wherein determining the optimal number of bits includes a recursive convex search according to an average power and an object transmission rate R sub t, and determining the final number of bits based on a result of search (page 4, par [45-48], [67-68] "the

parameters H(k) and N sub 0 map to the power of noise ratio. If the total transmit power, for the system is fixed and the allocation of the transmit power to N sub F then express in Eq (4), and combined the resulted of the evaluated for the specific modulation scheme").

As to claim 4, Jalali further discloses the adaptive resource allocation method of claim 3, wherein a relation between the average power and the object transmission rate R sub t is represented as P(R)=.sigma..sup.2.alpha..sup.-R and R>0 with reference to a given channel response and a modulator, where P(R) denotes an average power-transmission rate function, .sigma..sup.2 denotes a variance of radio wave signals, and a is greater than 1 (See page 3 through page 4, par. [0043-0054] "which defined noise variance of N sub o using modulation scheme M(k) which is an estimate of the power transmission rate function based on an equivalent data rate of D sub equiv to achieve the desired PER of P sub e that supported by the OFDM system for the given multi-path channel. The N sub r data rates may be ordered such that D(0) < D(1) < D(2)").

As to claim 5, Jalali further discloses the adaptive resource allocation method of claim 3, wherein the convex search process for searching an

optimal solution .lamda.* for the object transmission rate R.sub.t comprises: a) respectively initializing a supremum .lamda..sub.l and an infimum .lamda..sub.u of the object transmission rate to be 0 and .infin. (page 3, par. [0040-0041] "where r is an index for the data rates, r = 0, 1, …, N sub R -1 and the N sub R data rates D(o)<D(1)<D(2)…<D(N sub R – 1"); b) experimentally selecting an initial Lagrange multiplier estimate of .lamda. for the object transmission rate R.sub.t (page 4, par. [0045-0048]) "required on the AWGN channel to achieve the desired PER OF P sub e using the coding and modulation schemes associated with the data rate"); c) solving a transmission rate non-constraint problem until a Lagrange multiplier .lamda corresponding to the object transmission rate R.sub.t is found; d) searching for a lowest transmission rate R.sub.l and a highest transmission rate R.sub.h (page 4, par. [0049-0056] "determined the SNR needed in the AWGN channel in combined with the equivalent data rate D sub equiv using the modulation scheme M based on the estimate from low to high power or data rates); and e) returning to solving the transmission rate non-constraint problem (page 5, par. [0071-0074] "evaluates the available data rates, one at a time, from the maximum available data rate to the minimum available data rate to ensure that the desired PER can be achieved").

As to claim 22, the claim is rejected for the same reason as set forth in claim 1.

As to claim 23, Sudo further discloses symbol mapper and a symbol de-mapper for respectively mapping and de-mapping bits and power of symbols according to the bit table and the power table based on the output of switches 121 to 124 in place of the multipliers 106-109 in col. 10, lines 1-51.

Allowable Subject Matter

5. Claims 24-25 are allowed.

If claim(s) 24-25 overcome 35 U.S.C 101, and would be allowable if rewritten with qualify as a 101 statutory.

Conclusion

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to PHUOC H. DOAN whose telephone number is 571-272-7920. The examiner can normally be reached on 9:30 AM - 6:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, KINCAID LESTER can be reached on 571-272-7922. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/PHUOC DOAN/
12/04/08

/Lester Kincaid/
Supervisory Patent Examiner, Art Unit 2617